

REMARKS

Claims 58-68 are pending in the application with claims 1-57, 69-98, and 100-108 being withdrawn in view of the Restriction Requirement mailed September 26, 2006. Claims 58-68 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Reiss et al., *Nano Letters*, 2, (7), 781-784 (2002) (hereinafter “Reiss”) in view of United States Patent 5,300,793 to Kondow et al. (hereinafter “Kondow”) and United States Patent 4,675,207 to Nicolau (hereinafter “Nicolau”).

Applicant thanks the Examiner for the courtesy extended during the telephonic interview conducted on February 21, 2008. During the interview, the claims were discussed in view of the Reiss, Kondow, and Nicolau references. No agreement as to an allowance of the claims was reached during the interview. Applicant respectfully requests reconsideration of the present application in view of the following Remarks.

Claims 58-68 and 35 U.S.C. § 103(a)

The rejection of claims 58-68 under 35 U.S.C. § 103(a) as being unpatentable over Reiss in view of Kondow and Nicolau is respectfully traversed. Applicant has amended claims 58 and 59. Support for the present claim amendments is found on page 5, lines 26-29 and page 64, lines 24-31 as well as elsewhere throughout the specification.

To establish a prima facie case of obviousness, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The combination of Reiss, Kondow, and Nicolau does not teach or suggest a method of preparing core/shell nanocrystals wherein a cation precursor solution and an anion precursor solution are added in an alternating manner to a solution of core nanocrystals thereby resulting in a mixture comprising the solution of core nanocrystals, the cation precursor solution, and the anion precursor solution.

As recognized by the Office, Reiss fails to teach a method wherein a cation precursor solution and an anion precursor solution are added in an alternating manner to a solution of core nanocrystals.² Reiss only discloses a one-step method for the production of core/shell nanocrystals.

Moreover, Kondow does not cure the deficiencies of Reiss. Kondow does not teach or suggest a method of synthesizing core/shell nanocrystals through the alternating application of

² Office Action mailed April 2, 2007, pages 2-3.

cation and anion precursor solutions to a solution comprising core nanocrystals. Kondow fails to address and is not intended to address solution phase (liquid phase) synthetic techniques. The methods disclosed in Kondow are limited to vacuum conditions including high vacuum or ultrahigh vacuum conditions. The molecular beam epitaxy (MBE) and atomic layer epitaxy (ALE) methods described in Kondow, for example, require high vacuum conditions. Kondow recites:

A device for epitaxial growth may be an ordinary MBE (Molecular Beam Epitaxy) or ALE (Atomic Layer Epitaxy) device. Generally, the vacuum system of the MBE device is intensified in order to be used as a ALE device.³

High or ultrahigh vacuum conditions provide an ideal environment for epitaxial growth because contaminants and chemical species other than the intended reactants are not present to disrupt crystal lattice formation and crystal growth. Solution phase synthesis, however, provides the exact opposite conditions to those of a vacuum. In solution phase synthesis, a variety of species are present that could disrupt proper lattice formation and crystal growth. As a result, it is improper for the Office to equate high vacuum synthetic techniques, such as those described by Kondow, with the solution phase synthetic techniques of the present invention

Nicolau additionally fails to cure the deficiencies of Reiss and Kondow to teach or suggest a method of synthesizing core/shell nanocrystals through the alternating application of cation and anion precursor solutions to a solution comprising core nanocrystals. Nicolau discloses a method of immersing a unitary substrate in various individual salt solutions with rinsing between immersions. The rinsing step required by Nicolau is administered to clear the substrate of excess solution thereby facilitating the formation of at least two superimposed ionic layers. Nicolau, for example, recites:

Following the first immersion, the excess solution adhering to the substrate is eliminated during rinsing by convection and diffusion...The rinsing time is such that there is a complete elimination by convection and diffusion of the excess solution adhering to the substrate.⁴

The independent salt solutions and the rinsing between immersions preclude Nicolau from teaching or suggesting a method, as recited in the independent claims, wherein a mixture

³ Kondow, Column 4, lines 29-33.

⁴ Nicolau, Column 4, lines 20-23 and Column 5, lines 9-12.

comprising a solution of core nanocrystals, a cation precursor solution, and an anion precursor solution is formed.

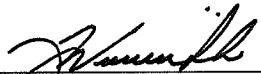
In view of the foregoing, Reiss, Kondow, and Nicolau, individually and in combination, do not teach a method consistent with that presently claimed. As a result, Applicants respectfully assert that claims 58-68 are patentable over the combination of Reiss, Kondow, and Nicolau and respectfully request that the present rejection be withdrawn.

CONCLUSION

In view of the foregoing, a favorable Office Action is respectfully solicited. The Examiner is respectfully invited to contact J. Clinton Wimbish at 704.338.5021 to discuss any matter related to the present application.

Respectfully submitted,

3/2/08
Date


J. Clinton Wimbish
Reg. No. 54,545

Kilpatrick Stockton LLP
Suite 2500
214 N. Tryon St.
Charlotte, NC 28202